THE CITY OF SAN DIEGO

February 22, 2005

2005 FEB 22 P 2:59

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

Mr. John Robertus
Executive Officer
Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Ste. 100
San Diego, 92123

Re: Comments on Tentative Amendment No. 5 to CAO 92-01
TSMC:40-0054.02:dorsk

Dear Mr. Robertus,

On April 29, 2004, the City of San Diego's Working Group for the Mission Valley Terminal submitted detailed comments on Kinder Morgan Energy Partners' (Kinder Morgan) Final Summary Report. These comments included a conceptual study for the beneficial use of the groundwater of this part of the Mission Valley Aquifer, an analysis by our technical expert, Dr. Richard Jackson of INTERA, Inc., and other analyses of regulatory requirements that apply to this situation. These documents are all included in this notebook, and we request that each of the Board members be given a copy of this notebook so they may see the record of the City's submissions. After presenting this information to the Board's staff at the May 2004 workshop, it was clear that the City's goals and Kinder Morgan's proposal were not consistent.

At your urging, among others, the City resolved to take the approach of meeting with Kinder Morgan to see if they would agree to a more aggressive and accelerated approach to the remediation of this site. After several meetings between the two parties and their technical experts, an agreement was reached to employ some of these more aggressive technologies. This agreement was reduced to writing, signed by both parties, and submitted to the RWQCB in a document called the "Summary of Understanding." Both Kinder Morgan and the City met with RWQCB staff to present the document, and informed staff that if its terms could be incorporated into the amended CAO, that the parties had agreed it would become the basis for a settlement of many of the issues that historically divided them. We have included a copy of the "Summary of Understanding" document for your review and that of the Board. Staff's initial response to the document was favorable, however, they explained that the board could not direct specific actions but only set timelines and expected results. Recognizing this, we are still hopeful the cooperative effort can be recognized in this process because review of the Tentative Amendment shows that several of the key elements of the document have not been included in the CAO, despite our urging and the agreement of both parties.

DIVERSITY BRINGS US ALL TOGETHER

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We therefore have two requests of the Regional Board with regard to this proposed Amendment to the existing CAO. First, we request that the elements of our agreement be incorporated into its terms, as described below. Second we request in the strongest terms that the dates proposed in the Amendment No. 5 not be viewed as the "final decision" on the timing for completion of remediation, but that a requirement to reconsider these timelines within one year's time be explicitly included in the Final Order for the purposes of reconsidering their appropriate acceleration.

The City's plans to use this aquifer for the benefit of San Diegans has been well documented and is the source of continuing concern. Accomplishing the cleanup in the shortest possible time is our prime goal. The City has studied the views of the Regional Board's experts, and concurs with many of their findings and observations, but notes that we still have data gaps that still create uncertainty about the Site Conceptual Model. Some significant data gaps will be filled during the next year of site activities, as the City's technical expert, Dr. Richard Jackson, indicates in the attached Letter Report. In addition, Kinder Morgan itself has agreed to try innovative technologies, such as the introduction of warm air to the SVE system, that might substantially accelerate the achievement of clean up goals. Our technical expert assures us that the aggressive approach the City and the discharger both agreed to is technically practicable and attainable using enhanced remediation techniques. Future data may illustrate that more ambitious timeframes can and should be incorporated into the CAO to protect this groundwater resource and the interests of the State and the City. A requirement for the discharger to come back to the Board after this information is gathered to review these crucial dates should be explicitly incorporated into the Order.

While our primary criticism concerns the timelines for action, there are aspects of the Tentative Amendment which we greatly appreciate. Although the dischargers are clearly ordered to prevent any further migration of petroleum products, the chosen technology, a barrier of wells that can intercept a release, is not fool proof, and the continued existence of the Terminal upgradient from the aquifer is a constant cause for concern. The requirement that the discharger prepare a comprehensive evaluation of on-site conditions at the Terminal, and a Feasibility Study to examine alternatives for clean up of this source of pollution, is gratefully acknowledged by the City. We are anxious to see the on-site cleanup proceed as well as the off-site cleanup on our own property. Community lands and water will always be at risk unless the Terminal is cleaned and operated with the utmost regard for preventing future releases.

The following individual points restate the broad concern and identify which elements of the "Summary of Understanding" document should have been incorporated into the Tentative Amendment:

1) In the preceding Time Schedule Order issued to Kinder Morgan, the RWQCB required that "measurable" NAPL be removed by December 31, 2007. Why is that requirement absent from the Tentative Amendment? In our view, this deadline should be reinstated because, if another prolonged drought should

occur, the residual LNAPL may drain to the now-deeper groundwater table and become measurable.

2) In the Tentative Amendment, the requirement to remove "residual" LNAPL is set for December 31, 2010. This is after the target date for the Mission Valley well field to become operational. We believe that removal of "residual" LNAPL can and should happen sooner, and we request that the Board specify that this timeline will be revisited once more complete data is available about practicable opportunities and enhanced strategies so that "residual" LNAPL is removed by December 31, 2008.

3) The agreement between the discharger and the City provided that enhanced methods would be used for the SVE system, and both parties specifically agreed to try the injection of warm air to increase vaporization in the vadose zone. While the RWQCB leaves the choice of technology to the parties, in this instance the parties have agreed and proposed to test more aggressive technologies. This should have been incorporated into the Tentative Order.

4) Pilot testing to determine the effectiveness of enhanced recovery methods of the dissolved phase of petroleum products was also agreed to by the parties but not included in the Order, as we requested. The potential for surfactant or cosolvent flooding was agreed to be studied, and the Order should incorporate this requirement.

5) The parties agreed that the air-sparging system, operated to augment the SVE system, should be continued. This point was agreed to by Paul Johnson, the independent RWQCB technical consultant, but was also not included in the Tentative Order.

6) Lastly, the discharger agreed to undertake an investigation of the utility lines that may have been impacted by the release, and again, no mention of this requirement was included.

This release dates back to 1988, and the RWQCB's CAO was issued in 1992. The original Orders called for the site to have been cleaned up by 2000. It was a year ago we presented our concerns and the data about the City's plans to use the aquifer. Due to circumstances beyond our control, (and yours) a year has slipped by when the more ambitious goals of the City's Proposed Order could have been put in place. Because of this lost year, timelines we advocated in April are already passing. The Board should simply not allow more time to slide by. An aggressive and proactive approach to remediating this important community asset is warranted. We urge the Board in the strongest terms to revise the Tentative Amendment to be consistent with the agreements between the parties, and to call for a reexamination of the deadlines for completion of NAPL removal, at least, within the next year. This, incidentally, will provide a basis for further settlement and agreements between the discharger and the City to our mutual benefit.

The City considers the Mission Valley Aquifer a prime candidate for development and has moved forward with development plans to the extent it can do so in a fiscally responsible manner under the circumstances. Since its May 2004 presentation to staff, the City has worked with the USGS to cause the installation of a monitoring well to study

general groundwater and geologic conditions as well as development of the aquifer. This well was installed last November. Attached is a map that shows the location of the USGS well. Also shown are the tentative locations of a test well and monitoring wells the City intends to install in the next few months, and potential production well sites. The City has also applied for state funds under Proposition 50 for a grant to further study the development of the aquifer. As we all agree, water is one of our most precious resources, and both the City and the community need the support of the Board to compel aggressive action to make up for lost time.

Sincerely,

Richard Mendes, Deputy City Manager

Attachments:

1) "Summary of Understandings"
2) Letter of Dr. Richard Jackson, INTERA, Inc.
3) Map showing well locations

cc: Grace C. Lowenberg, Deputy City Attorney
Richard Opper, Opper & Varco, LLP Special Counsel
Dr. R. Jackson, INTERA, Inc.
Marsi Steirer, Water Department Deputy Director
Kevin Ryan, Kinder Morgan Energy Partners
Scott Martin, LFR Levine Fricke

Summary of Understanding

Regarding Remediation of Contamination to City Property and Aquifer from the Mission Valley Terminal (MVT)

Two meetings have been held between representatives of the City of San Diego (the City) and Kinder Morgan Energy Partners, L.P. (Kinder Morgan) regarding the mitigation of the off-site impacts as a result of the release of petroleum products from Mission Valley Terminal (MVT). Those meetings were:

August 31, 2004 meeting:

Representing Kinder Morgan were: Nancy Van Burgel, Kevin Ryan, Scott Martin (LFR) and Scott Seyfried (LFR).

Representing the City were: Richard Opper (Opper & Varco LLP) and Dick Jackson (INTERA)

September 16, 2004 meeting:

Representing Kinder Morgan were: Nancy Van Burgel by telephone, Kevin Ryan, Scott Martin (LFR), Scott Seyfried (LFR), and Tim Taylor (Sheppard Mullin).

Representing the City were: Grace Lowenberg, Ted Olsen, Richard Opper (Opper & Varco LLP), and Dick Jackson (INTERA)

Introductory Statements:

The City stated that it wished to "break the back" of the gasoline contamination problem in the next 3 years prior to ground-breaking in 2007 for the Mission Valley groundwater desalting project. By that the City meant that it wished to see the vast majority of the contamination removed in this period, which would require an aggressive program of remediation that it wished to develop jointly with Kinder Morgan. In addition to the extraction of contaminated vapor and ground-water phases, this may include injection of fluids into the vadose and ground-water zones to enhance the recovery of the approximately 100,000 gallons of gasoline estimated to be trapped in the aquifer.

Kinder Morgan stated that it felt that the Regional Water Quality Control Board (RWQCB or the Water Board) had not clearly understood the intent of Kinder Morgan over this time period with respect to its intended remedial activities. Kinder Morgan is conducting hydraulic capture and soil-vapor extract (SVE) in the off-site area located in the Qualcomm Stadium parking lot. Also, Kinder Morgan is running its air sparging system in the pulsed mode in the offsite area. Furthermore, LFR reported that it was installing its Property Boundary Remedy at the south end of the MVT as we spoke. Once installed, the Property Boundary Remedy is planned to be implemented one year ahead of the schedule (January 2005) outlined in the Time Schedule Order Summary Report of February 2004.

Speaking on behalf of Kinder Morgan, LFR indicated that the SVE system is expected to reach an asymptote in its production of vapor phase hydrocarbons in about 3-4 years, after which time more aggressive remediation may be required in order to recover the remaining hydrocarbons in the unsaturated zone. LFR said that its goal was to contain and isolate the source, which it believes its efforts to date have already achieved. Therefore, LFR believed that the City was in a position to develop the aquifer and treat it in a new treatment facility when it is commissioned on or before the year 2010. LFR stated that it has divided the issue of site redevelopment into two parts and that the first part, aquifer redevelopment, could proceed without the second part, aquifer decontamination, being fully achieved.

The City replied that it could not accept such a division of approach and that it needed aquifer decontamination to be well underway before it could consider proceeding with aquifer development. The City noted that site redevelopment, including stores, condominiums, underground parking lots, and other structures that might be built, could impose a significant liability on both Kinder Morgan and the City in the form of potential vapor-phase intrusion if decontamination was not achieved.

Kinder Morgan responded that it did indeed wish to limit its liabilities and that the use of enhanced technologies could be appropriate for this task if necessary. LFR noted that it had already tested one innovative technology – in-situ sonic stimulation – but that it had failed to have any discernible effect on LNAPL recovery.

Furthermore, LFR noted that the schedule of any revised remedial actions that might be developed between Kinder Morgan and the City, with the Water Board's concurrence, would be constrained by site access. The City responded that it would do what it could to facilitate that access.

Elements of Agreement:

From this discussion, and with the understanding that timelines for accomplishing discrete tasks still need to be developed, the following outline for revisions to and clarifications of the Alternative Remediation Evaluation for Off-Site Source Reduction Report, submitted by Kinder Morgan to the RWQCB on April 26, 2004 (Alternative Remediation Report), for the next 6 months, subject to the acceptance and approval of the Water Board, emerged. That plan incorporates the following elements:

1. LFR will revise its site conceptual model of the LNAPL distribution that it presented in 2003 by incorporating all existing data into the model and by collecting new continuous core data from 5-10 locations within the Parking Lot that would provide a vertical profile of the LNAPL distribution. The revised site conceptual model will synthesize LFR's understanding of the Site geology, hydrogeology, fate and transport of LNAPL and dissolved phase, and potential exposure pathways, including preferential pathways of LNAPL migration.

2. A work plan for the pilot-scale testing of enhanced SVE will be prepared during Fall-Winter 2004-2005. This plan will describe the operation of a pilot test, where warm, dry air will be injected into LNAPL-contaminated parts of the vadose zone of the aquifer in order to test and monitor the recovery of the hydrocarbons and water vapors in the test section. It is expected that this pilot test will be conducted by Kinder Morgan in the spring of 2005. Also, the role of electrical resistance heating to enhance similar types of decontamination may be evaluated on a "hot-spot" treatment basis.

3. LFR will evaluate methods for the recovery of free-phase (i.e., mobile) LNAPL prior to the dewatering operations in January 2005, which the City feels will result in an opportunity to remove a large volume of gasoline in a short period of time. While noting the Water Board's word of caution with respect to the time required to obtain regulatory approval for the injection of chemicals into the aquifer, this evaluation will include cosolvent and surfactant flooding.

4. Kinder Morgan will continue with its expedited installation of the protective barrier of extraction wells to prevent further migration of contamination from the MVT onto the Qualcomm Stadium property so that the barrier will be fully operational by approximately January 2005. Once the protective barrier is installed, Kinder Morgan will continuously monitor the protective barrier to ensure it is being operated within planned operating and maintenance parameters and will notify a designated City representative(s) within 24 hours of the event if the barrier is compromised.

5. Kinder Morgan will continue operating the current air sparging system in pulsed mode to enhance the operation of the SVE system until dewatering renders the air sparging ineffective.

6. As part of task 1 above, Kinder Morgan will undertake a further investigation of the utilities under the public rights-of-way which may have been impacted by the contamination from the MVT. The City will assist in defining the parameters for this investigation.

Kinder Morgan will prepare a Remedial Plan Update which incorporates all of the above elements. Kinder Morgan will share the draft Remedial Plan Update with the City on November 1, 2004, so the City has a meaningful opportunity to review and comment on the Remedial Plan Update before it is submitted to the Board. The City anticipates submitting its comments to Kinder Morgan by November 8, 2004. The parties anticipate submitting the Remedial Plan Update to the Board by November 12th.

It is expected by the Parties that the Alternative Remediation Report and Remedial Plan Update will be subject to regular review and amendment, as more data is obtained from the iterative process of site mitigation. The City and Kinder Morgan will meet at least

quarterly to review remedial progress and discuss future planned activities, both Kinder Morgan's and the City's, until off-site remediation is substantially complete. Parties may mutually agree to change the frequency of meetings as deemed appropriate, but will meet at least annually until off-site remediation is substantially complete.

Kinder Morgan will provide work plans and remedial proposals to the City in draft form for review and comment prior to submittal to the Water Board. Both Kinder Morgan's and the City's staff and consultants agree to maintain a constructive dialogue and foster a cooperative working relationship. The Parties will strive to reach agreement on ongoing remedial activities which the Parties anticipate will continue beyond the time period contemplated in the Remedial Plan Update, and such agreements may be proposed to the Water Board for adoption into the Water Board's orders with respect to the remedial plans for off-site contamination. In the event the Parties are unable to reach agreement, Kinder Morgan reserves the right to make the final decision on submittals or proposals by Kinder Morgan on remedial actions to the Water Board. The City reserves the right to dispute or otherwise oppose, in whole or in part, submittals or proposals made by Kinder Morgan to the Water Board and to provide its own submittals and/or proposals to the Water Board.

The City of San Diego

By: Marsi Steinert
Its: Water Dept. Deputy Director

Date: 11/1/04

Kinder Morgan Energy Partners, L.P. by Kinder Morgan G.P., Inc., its General Partner, by Kinder Morgan Management, LLC, the delegate of Kinder Morgan, G.P., Inc.

By: Scott Kilkenny
Scott Kilkenny
Its: Vice President EHS

Date: 10-29-04

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February 21, 2005

Ms. Grace Lowenberg
City of San Diego, Office of the City Attorney
1200 Third Avenue
Suite 1100
San Diego CA 92101-4100

Re: Site Uncertainties, Technical Developments and Mission Valley Deadlines

Dear Grace:

I am disappointed with the Regional Water Quality Control Board's decision to issue *at this time* a revised set of deadlines for achieving site cleanup of the Mission Valley gasoline contamination. I believe these new deadlines are unnecessarily distant in the future (5-8 years) and should be reconsidered in early 2006 on the basis of new site information and innovative practices for gasoline removal.

Because of the agreement between the City of San Diego and Kinder Morgan and the level of technical collaboration that we have achieved in the past six months, we will learn much more about the conditions in the Mission Valley aquifer this year and will resolve critical uncertainties. Let me summarize the uncertainties that will be significantly reduced during 2005:

1. The remaining volume of gasoline trapped in the soils beneath the Parking Lot is not known. It may be as little as 20,000 gallons, but it could be substantially more. Because of the drilling of a series of boreholes and the collection of associated soil samples this Spring by LFR, Kinder Morgan's consultants, we will have a much better understanding by summer of the remaining gasoline volume and its spatial distribution. Needless to say, having this information is essential to developing reliable estimates of cleanup times that are most uncertain given our present knowledge.

2. The proposed deadlines for cleanup are apparently based upon experience at similar sites where soil vapor extraction (SVE) coupled with de-watering to expose the gasoline 'smear' zone are practiced. However, this practice ignores the well-known observation that as the water table drops, it is not only the soil water that drains to the deeper water table but also some residual gasoline drains and may re-appear at the water table as floating product (see attached figure on the cause of this phenomenon). Therefore, while this practice may aid in removing gasoline from the unsaturated zone of the aquifer it may cause additional migration of the gasoline to the water table, thus allowing more benzene and MTBE to dissolve into ground water that must be recovered along with the newly-mobilized gasoline. We need to understand how the dewatering operations now occurring due to the new Property Boundary wells may affect gasoline

drainage as the water table declines. Quite obviously, if we knew more about the volume of gasoline remaining in-situ – as we will later this year – we would be able to better predict what the effect of dewatering will be on the remaining gasoline.

3. The mechanisms of MTBE degradation in general are becoming better understood by environmental scientists, but the processes at work in the Mission Valley aquifer that appear to cause MTBE biodegradation are not yet established. Therefore, it would be prudent to fully assess the processes governing MTBE biodegradation and transport in Mission Valley before establishing deadlines to meet regulatory limits.

At the City's urging, Kinder Morgan has agreed to undertake tests of enhanced gasoline recovery in both the unsaturated and saturated zones of the aquifer. In the first case, a work plan for a pilot test of warm-air injection into the unsaturated zone above the water table is in preparation. In the second case, a plan to use cosolvents or surfactants to remove gasoline at and below the water table is to be developed. Although I cannot speak knowledgeably about the use of cosolvents (alcohols), surfactant-enhanced aquifer remediation (SEAR) is readily implemented and requires only site-specific design to accommodate the nature of the alluvial soils in Mission Valley.

By early 2006, it is likely that the warm-air injection pilot will have been undertaken and the results made known. Also by that time, BP Oil will have completed evaluation of SEAR for removal of trapped gasoline in alluvial soils at the former Casper refinery in Wyoming and the results of that study will also become known. Even if it were decided, following a pilot test of cosolvent- or surfactant-enhanced recovery technologies, to not employ such technologies at a larger scale in Mission Valley, the simple act of injecting treated water from K-M's on-site treatment plant into the gasoline smear zone – already demonstrated by BP at Casper and by INTERA at the former Gulf refinery in Ohio – will accelerate the dissolution of the smear zone by passing many pore volumes of clean water through the contaminated zone over a period of months. Such "waterflooding" is readily designed and undertaken but seldom used by environmental engineers despite the fact that petroleum engineers have used the technique since the 1950s.

Therefore, there are strong reasons to delay setting finalized deadlines in 2005 that reach 5 to 8 years in the future. Not only are there significant uncertainties about site conditions that will be much reduced during 2005, but also pilot tests already planned will point the way to accelerated cleanup. Consequently, I recommend that the City urge the Board to delay finalizing the deadlines published in Tentative Addendum No. 5 for LNAPL removal in the off-property area (December 31, 2010) and meeting the MCLs (December 31, 2013) and merely adopt the proposed deadlines as 'interim' pending their re-consideration in early 2006.

Yours truly,

Dick Jackson

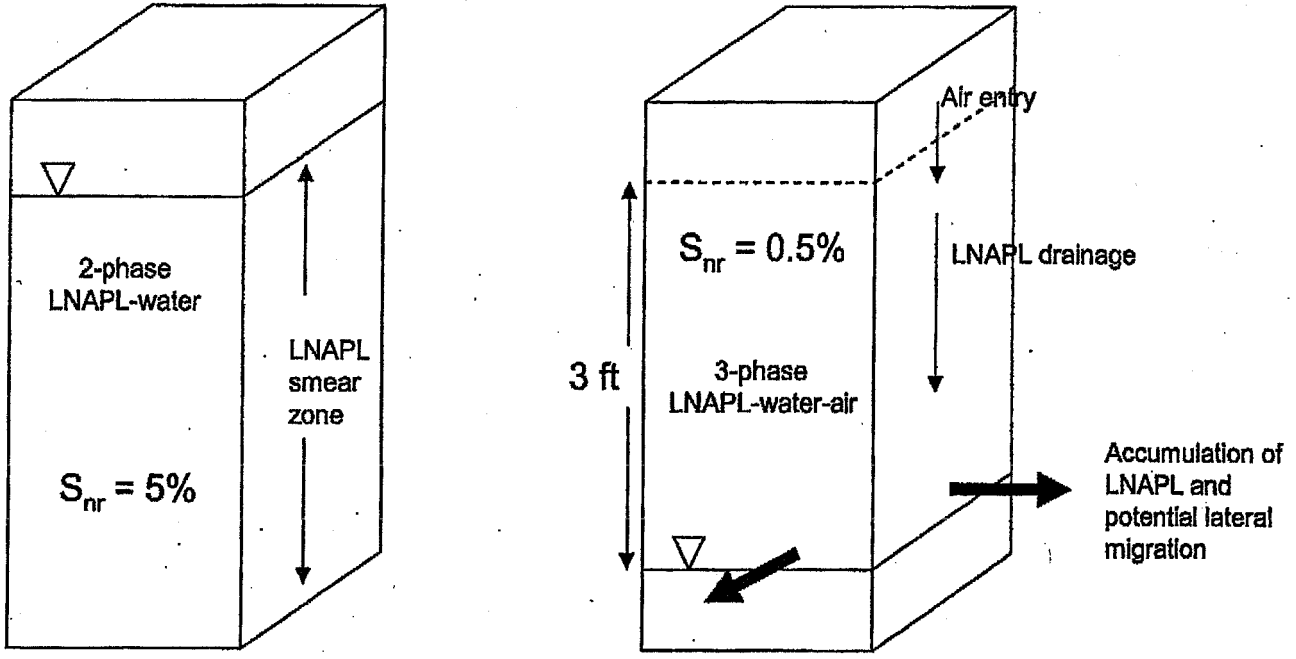
Richard E. Jackson, Ph.D.
Principal

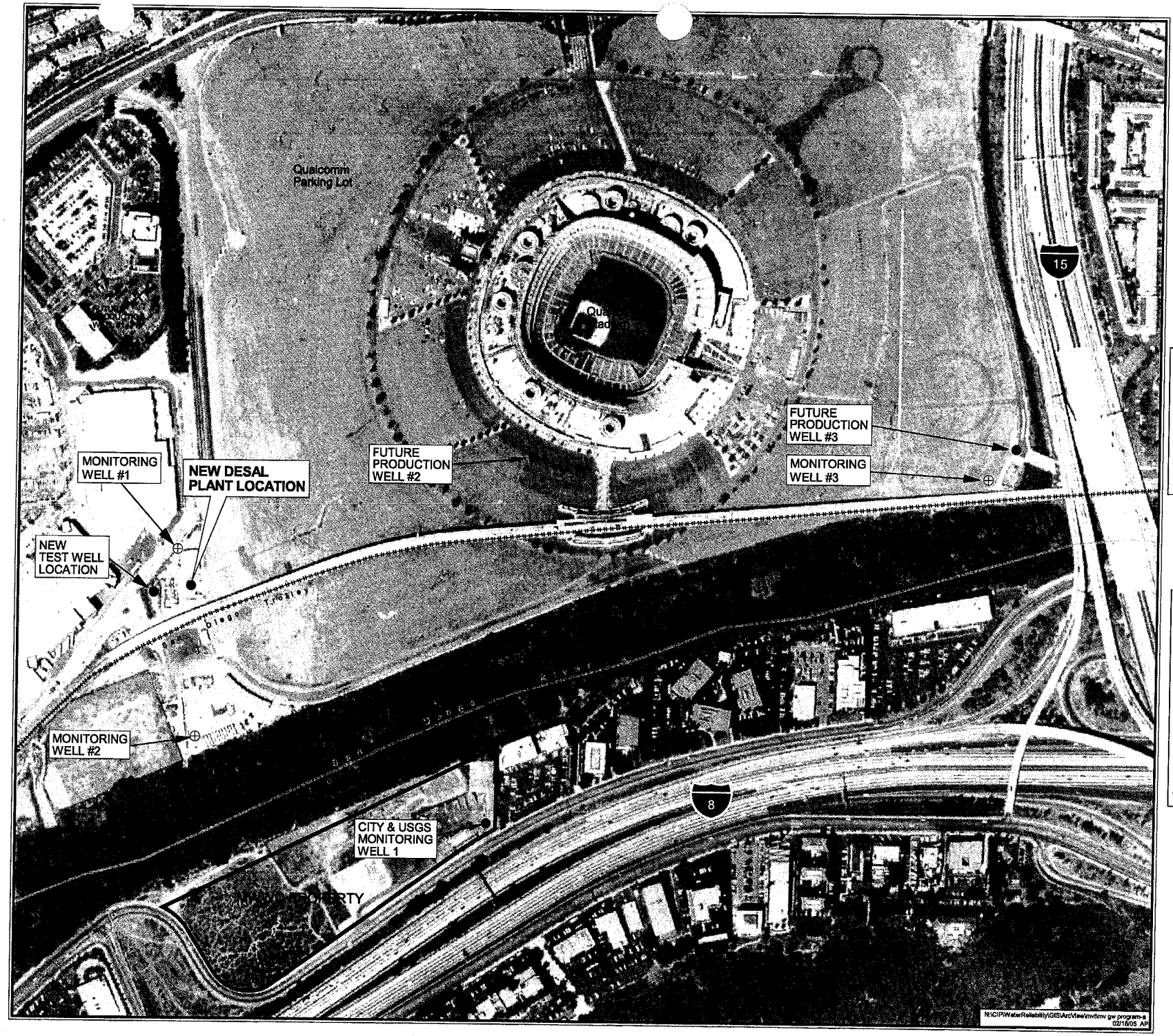
LNAPL Drainage due to Water-Table Lowering

Assuming:

two-phase $S_{nr} \approx 5\%$ [i.e., ground water + LNAPL]
three-phase $S_{nr} \approx 0.5\%$ [i.e., air + residual ground water + LNAPL]
porosity $\approx 35\%$

A 3 ft drop in the 'water table' through a zone previously saturated with water and residual LNAPL would result in the remobilization of approximately 0.35 gallons of LNAPL per areal square ft of aquifer. The residual 2- and 3-phase LNAPL saturations used above are those measured by INTERA in alluvium at the former Gulf Oil refinery in Ohio. After air entry into the smear zone, the LNAPL is free to drain by gravity as air now occupies the bulk of the pores. Thus the LNAPL attains a much lower residual saturation and may accumulate at the lowered 'water table'.



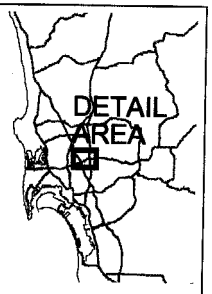


SanGIS

0 100 200 300 400 500 Feet

LEGEND

- ⊕ Production Well
- ● Monitoring Well
- San Diego Trolley Line



VICINITY MAP No Scale

Mission Valley Groundwater Program